

DETAILED ACTION

Status of the Claims

Claims 1-8 are currently pending.

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03/10/2011 has been entered.

Priority

Instant application 10/574,487 filed on 12/11/2007 is a 371 national stage entry of PCT/US04/32341 filed on 10/01/2004, which claims priority to application 60/507,514 filed on 10/02/2003.

Claim Objections

Claim 3 is objected to because of the following informalities: the term "dimmers" appears to be a typographical error for the term "dimers". Appropriate correction is required.

Claim 8 is objected to because of the following informalities: the phrase "...is conducted at as pH higher than..." (emphasis added) appears to be a typographical

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error for the phrase "...is conducted at a pH higher than..." (emphasis added).

Appropriate correction is required.

Applicant is advised that should **claim 6** be found allowable, **claim 7** will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Withdrawn Objection(s) and/or Rejection(s)

The rejections of **claims 1-8** under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement are hereby withdrawn upon further consideration.

The rejections of **claims 1-8** under 35 U.S.C. 112, second paragraph, as lacking antecedent basis are hereby withdrawn in light of Applicant's amendment to claim 1.

The rejections of **claims 1-3** under 35 U.S.C. § 102(b) as being anticipated by **Petasis et al.**, U.S. Patent No., 6,927,294 are hereby withdrawn upon further consideration.

The rejections of **claims 1-8** under 35 U.S.C. § 103(a) as being unpatentable over **Bourne et al.**, Journal of Chromatography A, Volume 11(2):253-257 (1963), in view of **Petasis et al.**, U.S. Patent No., 6,927,294 are hereby withdrawn upon further consideration.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites a library comprising "only at least one desired isomer". However, this language is vague and indefinite since a library of compounds must consist of at least two compounds to be considered a library. For the purposes of claim interpretation for the Office action herein, this claim is interpreted to consist of at least two isomers (i.e. two compounds). **Claims 2-8** are similarly rejected, as they are dependent on independent claim 1.

Claim 3 is amenable to two plausible constructions: either (a) a dimer or oligomer, each having monomers connected by an ester group, or (b) a dimer having monomers connected by any bond, or an oligomer having monomers connected by an ester group. According to current Office practice, "Where the claim is subject to more than one interpretation and at least one interpretation would render the claim unpatentable over the prior art, the examiner should reject the claim as indefinite under 35 U.S.C. §112, second paragraph, and should reject the claim over the prior art based on the interpretation of the claim that renders the prior art applicable." (From 9/2/08 Memo entitled "Indefiniteness Rejections under 35 USC 112, 2nd Paragraph", page 2/5:

http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/section_112_2nd_09_02_2008.pdf). In the instant case, the Examiner has found prior art for the latter (b) interpretation (applied below).

Claims 6, 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 6, 7 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. Claims 6, 7 recite the method of claim 1, "wherein the carbohydrate scaffold is inositol". Claim 1 requires "subjecting a carbohydrate scaffold [inositol] to intramolecular acyl migration", however, inositol does not possess any acyl groups and therefore cannot be subjected to intramolecular acyl transfer. The omitted element is at least one acyl group. Since there are no acyl groups on inositol, the metes and bounds of the claims are unascertainable.

In accordance with MPEP 2173.02: If the language of the claim is such that a person of ordinary skill in the art could not interpret the metes and bounds of the claim so as to understand how to avoid infringement, a rejection of the claim under 35 U.S.C. 112, second paragraph, would be appropriate. See *Morton Int'l, Inc. v. Cardinal Chem. Co.*, 5 F.3d 1464, 1470, 28 USPQ2d 1190, 1195 (Fed. Cir. 1993).

As currently written, the metes and bounds of the offending claims are unascertainable for the reasons set forth above, thus claims 6, 7 and all dependent claims (if any) are rejected under 35 USC 112, second paragraph.

Claim Rejections – 35 U.S.C. 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Liao

Claims 1, 2, 4, 5 are rejected under 35 U.S.C. 102(b) as being anticipated by **Liao et al.** (*Chinese Journal of Chemistry*, 2001, 19:1119-1129).

Liao et al. teaches, throughout the reference, a method of generating a carbohydrate library (e.g. p. 1121, right column, second paragraph; a library may comprise as few as two members) containing only at least one isomer (e.g. products **17** and **18** of Scheme 2 of p. 1121) comprising subjecting a carbohydrate scaffold to intramolecular acyl migration (e.g. step from **16** to **17** of Scheme 2) comprising adding to the reaction a boronic acid (e.g. polystyrylboronic acid **A**, as per Scheme 2), whereby the boronic acid added to the reaction shifts the equilibrium of the reaction to at least one isomer (e.g. products **17** and **18** of Scheme 2 of p. 1121), as set forth in **claim 1**.

Liao et al. further teaches the above method wherein the carbohydrate scaffold is a monomeric carbohydrate (e.g. starting compound **1** of Scheme 2), as set forth in **claim 2**.

The reference also teaches that the boronic acid is phenyl boronic acid (e.g. polystyrylboronic acid, as per Scheme 2, is an immobilized phenyl boronic acid), as set forth in **claim 4**.

Liao et al. also teach the above method conducted in a basic medium (e.g. addition of saturating amounts of NaHCO₃ in Scheme 2), as set forth in **claim 5**.

Claim Rejections – 35 U.S.C. 103(a)

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Liao and Meutermans

Claims 1, 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Liao et al.** (*Chinese Journal of Chemistry*, 2001, 19:1119-1129) in view of **Meutermans et al.** (U.S. PGPub 2011/0201794).

Liao et al. is relied on as above for **claims 1, 2, 4, 5**.

However, Liao et al. is silent on the use of dimers for carbohydrate scaffolds in the above method, as set forth in **claim 3**.

Meutermans et al. teaches, throughout the document and especially the title, Abstract, and Summary of the Invention, a method of making disaccharides (e.g. para 0010-0012) made from monosaccharides having ester bonds (e.g. examples for groups d and e in para 0029, and/or claim 62) for carbohydrate scaffolds in a method to create a carbohydrate library

It would have been *prima facie* obvious to a person of ordinary skill in the art at the time the invention was made to generate the carbohydrate library as per Liao et al. using the carbohydrate scaffold dimers as per Meutermans et al.

One of ordinary skill in the art would have been motivated to generate the carbohydrate library as per Liao et al. using the carbohydrate scaffold dimers per Meutermans et al. since such disaccharide carbohydrate scaffolds can accommodate a greater number of binding groups (e.g. up to 8) than the monosaccharides of Liao et al alone and additionally, disaccharide scaffolds can be used as probes of interactions

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which involve large surface areas, each of which is advantageous according to Meutermans et al. paras 0004-0005. Furthermore, in accordance with MPEP 2141 section III (B) citing *KSR International Co. v. Teleflex Inc. (KSR)*, 550 U.S. 398, 82 USPQ2d 1385,1395 (2007) Simple substitution (disaccharides for monosaccharides) of one known element for another to obtain predictable results is obvious.

One of ordinary skill in the art would have had a reasonable expectation of success in generating the carbohydrate library as per Liao et al. using the carbohydrate scaffold dimers as per Meutermans et al. since both references covered such highly overlapping scope, namely, the generation of combinatorial carbohydrate libraries, and accordingly, the teachings of Liao et al concerning monosaccharides may be handily extended to the dimers of interest to Meutermans et al.

Liao and Kitano

Claims 1, 2, 4, 5, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Liao et al.** (*Chinese Journal of Chemistry*, 2001, 19:1119-1129) in view of **Kitano et al.** (*Polymers for Advanced Technologies*, 2003, 2:261-264).

Liao et al. is relied on as above for **claims 1, 2, 4, 5**.

However, Liao et al. is silent on the above method wherein the reaction takes place at a pH higher than the pKa of the boronic acid, as set forth in **claim 8**.

Kitano et al. teaches, throughout the reference, that boronic acids need to be in the tetrahedral anionic form, which occurs more at pH values higher than the pKa of

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boronoate, in order to form the covalent complexes with *cis*-diols (e.g. see paragraph bridging pp 261-262) per **claim 8**.

It would have been *prima facie* obvious to a person of ordinary skill in the art at the time the invention was made to generate the carbohydrate library as per Liao et al. at a pH higher than the pKa value of the boronic acid, as per Kitano et al.

One of ordinary skill in the art would have been motivated to generate the carbohydrate library as per Liao et al. at a pH higher than the pKa value of the boronic acid, as per Kitano et al because the requisite carbohydrates indeed bear *cis*-diols. Additionally, with respect to pH (i.e. concentration of hydronium ion), in accordance with MPEP 2144.05:

Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

One of ordinary skill in the art would have had a reasonable expectation of success in generating the carbohydrate library as per Liao et al. at a pH higher than the pKa value of the boronic acid, as per Kitano et al. since boronic acid binding to *cis*-diols, in aqueous solution occurs in the tetrahedral anionic form (i.e. above the pKa value of the boronic acid).

Conclusion

No claims are allowed.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeremy Flinders whose telephone number is (571)270-1022. The examiner can normally be reached Monday through Friday, 8:00 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor is Ardin Marschel, who can be reached at (571)272-0718. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JCF

/CHRISTOPHER M GROSS/

Primary Examiner, Art Unit 1636